PATENT SPECIFICATION (11) 1 535 095

(21) Application No. 24017/76 (22) Filed 10 June 1976
(23) Complete Specification filed 3 June 1977
(44) Complete Specification published 6 Dec. 1978
(51) INT CL² G07F 17/34
(52) Index at acceptance G4V 118 AA
(72) Inventor HILTON MUNCASTER

1535095

(54) GAMING MACHINE

(71) We, BELL-FRUIT MANUFACTURING COMPANY LIMITED, a British Company, of Leen Gate, Lenton, Nottingham, NG7 2ND, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a gaming machine of the kind which allows a player to play a game and awards a prize if a predetermined result is obtained.

A commonly known machine of this kind, called a fruit machine, displays a combination of symbols to the player and operates in a random manner to change the displayed combination during each game, the machine awarding prizes according to the nature of this final displayed combination. Fruit machines have been modified so as to incorporate a "hold feature", whereby any one of the symbols displayed at the beginning of a game can be prevented from being changed so that this symbol appears in the final displayed combination. Fruit machines have also been modified so as to incorporate a "nudge feature", whereby the player can change any one of the symbols in the final displayed combination by replacing this with another symbol which is also visible to him. Typically, each symbol of the displayed combination is mounted on a separate reel or disc with a plurality of others, and the displayed symbol and one next to it are both visible and the former can be replaced by the latter by indexing the reel or disc one symbol spacing.

A gaming machine according to the present invention comprises display means that operates during each game to display a first combination of symbols, each of which is selected at random from a fixed number of symbols, and manual control means that is operable by a player during a game so as to change said first combination of symbols displayed by said display means during that game, said manual control means enabling each of one or more of said symbols of the first combination to be re-selected from all of said fixed number of symbols.

The machine may be adapted so that there is just one set of prize-winning combinations and the player operates the manual control means in an attempt to convert a non-prize-winning, first selected combination of symbols into a prize-winning combination of symbols.

Alternatively, the machine may be adapted so that there is one set of prize-winning combinations which is effective for the first selected combination of symbols, and a second, different prize-winning combination of symbols which is effective when the manual control means is operated, the object of operating the manual control means being to attempt to produce the second prize-winning combination of symbols or one of them. In this embodiment, the game played on the machine can be considered as two games, that is, a main or primary game and a subsidiary or secondary game which is available at no extra cost to the player.

The manual control means may be operative during each and every game or only during some games; in the latter case, the manual control means being operative only during randomly selected games or only during those games that result in a particular first selected combination of symbols.

When operative, the manual control means may be such as to allow a predetermined maximum number of symbol changes to be made or to allow an unlimited number of symbol changes to be made in a predetermined time.

Replacement of a symbol of said first selected combination of symbols with another symbol may take place in a completely random manner. Preferably, however, the manual control means is such as to allow the player to exercise some skill in attempting to determine the next symbol to be displayed. For example, if the display means comprises a set of symbol carrying reels or discs which are spun and stopped to produce the first selected combination of symbols, the manual control means may comprise a separate control

switch for each reel which, when operated, causes the reel to re-spin and stops the reel when released so that the player can watch the spinning reel and attempt to release the control switch at the appropriate time to stop the reel with it displaying a particular desired symbol.

The invention will now be described by way of example with reference to the accompanying drawings in which:—

Figure 1 is a schematic front view of a fruit machine according to the invention,

Figure 2 is a circuit diagram showing part of the control circuitry of the fruit machine of Figure 1, and

Figure 3 is a circuit diagram showing part of the control circuitry of an alternative fruit machine according to the invention.

The fruit machine shown in Figure 1 has display means comprising a set of three rotatable co-axial reels R1, R2 and R3, each of which carries a plurality of symbols S around its periphery and displays a corresponding symbol in a display window W in each of a plurality of stop positions, the reels thereby displaying a combination of symbols in a row in the display window when stationary. The reels are spun and stopped in random stop positions during each game on the machine so as to display a first combination of symbols in the display window, and a prize is awarded if this combination corresponds to any one of a set of prize-winning combinations that can occur. The reels are driven by an electric motor which is connected to each reel through a respective slipping clutch, and starting and stopping of each reel is controlled separately by a respective solenoid-operated latch member which, for each stop position of the reel, engages a respective notch in the periphery of a disc that rotates with the reel. The electric motor, clutches and latch members are not shown as these may all be of well known construction such as used in conventional fruit machine reel mechanisms.

A programmer controls the operating sequence of the machine, including the detection of player credit produced by the insertion of a token or coin into a coin slot mechanism C of the machine, the detection of a start signal produced by the player operating a start button B to commence a game, the spinning and stopping of the reels, the detection of any prize-winning combination of symbols displayed by the reels, and the award of an appropriate prize for any detected prize-winning combination of symbols. The programmer in this embodiment takes the form of a cam timer, and Figure 2 shows three of the cam switches CS1, CS2 and CS3 of the cam timer that control the latch members of the three reels R1, R2 and R3 through the solenoids L1, L2 and L3, respectively, energisation of each solenoid causing the associated latch to disengage the reel with which it co-operates so that the latter is freed to rotate.

The fruit machine also incorporates the known idea of a 'hold feature' whereby a player can prevent any of the reels from rotating during a game by operating selected hold buttons H1, H2 and H3 at the beginning of the game. Each hold button H1, H2 and H3 is operatively associated with a respective reel R1, R2 and R3 through a switch H1, H2 and H3 (Figure 2) that controls energisation of a hold relay HR1, HR2 and HR3 having switch contacts HR1—3, HR2—3 and HR3—3 in the energization circuit of the solenoid L1, L2 and L3 controlling the respective reel latch. The 'hold feature' is made available at random during succcessive games by random selector means (not shown) that controls energisation of an anti-hold relay with switch contacts AH. At the beginning of each game, the anti-hold relay is either energised or de-energised depending on operation of the random selector means in the previous game, and if energised, it closes the switch contacts AH in the energization circuit including switch contacts F—2 to the hold switches H1, H2, H3, and indicates to the pyayer by means of indicator lamps IH that the 'hold feature' is available in the game that he has paid for and is about to play.

If the 'hold feature' is not available at the beginning of a game, the anti-hold relay is de-energized and its switch contacts AH assume the state shown in Figure 2 in which they disconnect the positive supply from the hold switches H1 to H3, thereby rendering the latter ineffective in energising the hold relays HR1 to HR3. Thus, when the player initiates a game by operating the start button B, the cam timer closes all three cam switches CS1, CS2 and CS3 simultaneously, and thereby completes the energisation circuits through the hold relay switch contacts HR1—3, HR2—3 and HR3—3 to energise the reel latch solenoids L1, L2 and L3. All three reels are therefore released and begin spinning. Later in the machine cycle, the cam switches CS1, CS2 and CS3 are opened one after the other and as a result each energisation circuit in turn is broken and each reel in turn is brought to a stop by release of the associated reel latch.

On the other hand, if the 'hold feature' is available, the anti-hold relay is energised and the switch contacts AH are closed, thereby connecting the positive side of the supply to the three hold switches H1 to H3. Pressing of a hold button, for example, button H1 will therefore close the associated hold switch H1 and complete the energisation circuit to the hold relay HR1. Energisation of the hold relay HR1 causes its three switch contacts HR1—1, HR1—2, HR1—3 to change over from the states shown in the Figure to the opposite states; the switch contacts HR1—1 thereby completing a relay holding circuit via switch contacts F—1, FS—1 and FT

that holds the hold relay HR1 energised when the hold button H1 is released, the switch contacts HR1—2 thereby connecting the switch contacts F—2 and F—3 to the switch contacts HR1—3, HR2—3 and HR3—3, and the switch contacts HR1—3 thereby disconnecting the cam switch CS1 from the reel latch solenoid L1 and connecting the latter to the switch contacts F—2 and F—3 via the switch contacts HR1—2. The latter connection is of no effect because of the state of switch contacts F—2 and F—3 when the 'hold feature' is operative, and thus the only practical effects of operating the hold button H1 is to energise the hold relay HR1 which holds itself energised and disconnects the latch reel solenoid L1 of cam switch CS1. Therefore, subsequent closure of cam switch following initiation of a game by operation of the start button B as described above, does not cause energisation of the latch reel solenoid L1 and as a result the latch member holds the reel R1 stationary during the game whilst reels R2 and R3 are spun.

This basic arrangement of the hold relays controlling the reel latch solenoids is already known. However, the illustrated machine differs from the known fruit machines in that it is adapted so that under certain conditions the hold buttons H1 to H3 can be operated, not to hold the reels R1 to R3, but instead to cause each associated reel to spin. This change in the function of the hold buttons is used to allow one or more of the reels to be re-spun following random selection of a first combination of symbols during a game. In particular, this "re-spin feature" is made available as a special feature when said first selected combination of symbols corresponds to a special combination of symbols. The player is then given a preset length of time in which he can re-spin any of the reels as many times as he can manage in an attempt to display a special prize-winning combination of symbols in window W, the circuitry being arranged so that the reel associated with each hold button re-spins only while that button is depressed, thereby enabling the player to use some skill in attempting to produce said special prize-winning combination of symbols.

The win detecting means that detects the normal prize-winning combinations of symbols that can occur in the first selected combination of symbols, also detects the occurrence of the special combination of symbols triggering the "re-spin feature". Once this special combination of symbols is detected, a special feature lamp IF (Figure 1) is lit and a feature relay is energized, which interrupts operation of the cam timer whilst energised and causes switch contacts F—1, F—2 and F—3 (Figure 2) to change over from the states shown to the opposite states. Switch contacts F—1 now break the holding circuit to the hold relays HR1, HR2 and HR3, switch contacts F—2 disconnect the hold switches H1, H2 and H3 from the anti-hold switch contacts AH and instead connect the hold switches to the switch contacts F—3, which in turn connect the hold switches to the positive side of the supply. Thus, the hold switches are now powered independently of random selection of the 'hold feature', and the length of time for which the hold relays are energised is made directly dependent on the time for which the hold switches are then depressed.

Operation of a hold button, for example, button H1, closes the associated hold switch HR1 and energises the hold relay HR1. The hold relay switch contacts change over to the opposite states to those shown in Figure 2. Change over of the switch contacts HR1—1 is of no effect because switch contacts F—1 have already broken the holding circuits to the hold relays, but change over of the switch contacts HR1—2 and HR1—3 serves to connect the positive supply through switch contacts F—3 to the reel latch solenoid L1 causing the latter to be energised and to release the associated latch member so that the reel R1 spins. The solenoid L1 remains energised and the reel R1 spins for as long as the hold button H1 is depressed, and ceases when the hold button is released.

It will be appreciated that the hold buttons can be operated in this way to spin any of the reels as many times as desired whilst the feature relay remains energised and its switch contacts F—1, F—2 and F—3 are switched over. However, the feature relay is only energised for a limited time, predetermined by a clock T that produces a display on the front of the machine (Figure 1). Commencement of the limited time period is triggered by a feature start relay FS which is connected between a normally earthed output of the clock T and the switch contacts HR1—2, HR2—2 and HR3—2 so as to be energised as soon as a hold button is first depressed. For example, if the hold button H1 is the first operated, change over of the associated hold relay switch contacts HR1—2 will energise the feature start relay FS, which will therefore change its switch contacts FS—1 and FS—2 to the opposite states to those illustrated. Switch contacts FS—1 will then complete a holding circuit through switch contacts FT to hold the feature start relay FS energised, and the switch contacts FS—2 start the clock T operating. Once the predetermined time period is completed the potential on the normally earthed output from the clock to the feature start relay is raised, thereby de-energising the latter relay and also de-energising the feature relay (not shown) so that the switch contacts FS—1, FS—2 and F—1, F—2, F—3 all return to the illustrated state in which the hold buttons are disabled.

In order to avoid any unnecessary delay should a player produce the special prize-

winning combination of symbols within said predetermined period of time, special detecting means is provided which operates only during said predetermined period and energises a feature stop relay (not shown) when it detects the occurrence of said special prize-winning combination of symbols on the stationary reels. When energised, this feature stop relay opens its switch contacts FT to interrupt the holding circuit to the feature start relay FS, thereby de-energising the latter. Energisation of the feature stop relay also causes de-energisation of the feature relay so that the switch contacts all assume the illustrated positions in Figure 2 and the hold buttons are disabled.

In order to positively suppress the detection of the special prize-winning combination of symbols whilst a reel is spinning, an inhibit relay IR is provided in series with the three hold relay switch contacts HR1—2, HR2—2 and HR3—2 so that it is only energised when none of the three hold buttons is depressed and only then operates associated switch contacts to allow detection of the special prize-winning combination of symbols.

De-energisation of the feature relay disables the hold buttons as described above and also allows the cam timer to resume operation. The cam timer now initiates a second win detecting step in which the win detecting means selectively detects the special prize-winning combination of symbols if the player has been able to make the reels display this combination, any other normal prize-winning combinations of symbols being ignored during this second win detecting step.

Typically, the special prize-winning combination of symbols comprises a row of three special symbols, the same special symbols being displayed by each reel in window W. A prize is awarded by the machine through a prize-dispensing mechanism D if this special combination of three symbols is displayed when the "re-spin feature" is available. Also, the win detecting means can be adapted so as to detect the occurrence of said special symbol on just one or two of the reels and to initiate the award of a lesser prize.

As an example, the illustrated machine could be designed with a race theme in mind, the special feature combination of symbols being the display of a starter's gun symbol on the two outer reels, and the special prize-winning combination of symbols that the player has to produce on the reels by operating the hold buttons, being a row of three runner symbols, the time period allowed to produce this combination being the world record for the men's 100 metres (e.g. 10 seconds) which is counted off on the clock display T.

An alternative embodiment of the invention is illustrated in Figure 3 of the drawings in which three hold buttons H1 to H3 are again used to control three respective reels, the same buttons being effective at different times either to hold the reels or to re-spin them, but the "hold feature" and "re-spin feature" are both made available in a random and mutually exclusive manner so that during any game played on the machine, the player may be offered the opportunity of either holding one or more of the reels against rotation before initiating a game, or re-spinning one or more of the reels after they have been spun to produce a first selected combination of symbols.

The basic arrangement of the hold switches H1 to H3 in respective series circuits with the hold relays HR1 to HR3, and the reel latch solenoids L1 to L3 in respective series circuits with cam switches CS1 to CS3 and switch contacts HR1—2, HR2—2 and HR3—3 of the hold relays, is the same as that of the first embodiment shown in Figure 2. Further, the embodiment of Figure 3 has an anti-hold relay with switch contacts AH and a feature relay with switch contacts F—4 connected in series with the switch contacts AH in the positive supply line to the hold switches. Thus, as in the first embodiment, when the anti-hold relay and feature relay are de-energised the positive supply to the hold switches is broken and the hold buttons are rendered ineffective. However, if the anti-hold relay is energised, the positive supply is connected to the hold switches and operation of a hold button causes energisation of the associated hold relay, which in turn holds itself energised through switch contacts HR1—1, HR2—1, HR3—1 and disconnects the associated reel latch solenoid from its cam switch so that the solenoid cannot be energised and the associated reel is therefore held against rotation.

The embodiment of Figure 3 differs from the first embodiment in the arrangement of the switch contacts of the feature relay. These switch contacts include the three switch contacts F—1 to F—3 which are respectively connected between the hold switches H1 to H3 and the hold relays HR1 to HR3 and have a connection to the reel latch solenoids L1 to L3 so that energisation of the feature relay causes the hold switches to be disconnected from the hold relays and connected directly to the reel latch solenoids. Operation of a hold button, for example, hold button H1, then completes an energisation circuit directly to the associated reel latch solenoid L1 through the associated feature relay switch contacts F—1, and the associated hold relay HR1 remains de-energised.

Random selection of the "hold feature" and the "re-spin feature" is achieved through operation of random selector means during each game which can energise either the hold relay or the feature relay or neither.

Again, the "re-spin feature" is made available for a predetermined period of time determined by a timer (not shown) that controls

the time for which the feature relay is energised.

The prize-winning combinations of symbols that the player aims to display on the reels when operating the hold buttons to re-spin the reels may either be the normal prize-winning combinations or special prize-winning combinations different from the normal prize-winning combinations, only the latter being effective for the first selected combination of symbols, and only the former being effective after re-spinning the reels.

In both of the illustrated embodiments, buttons are used both for holding the reels against rotation and also for re-spinning the reels. However, it will be appreciated that in other embodiments the "hold feature" could be removed, the buttons then serving as re-spin buttons only. The illustrated embodiments can be modified in this way simply by disabling the anti-hold relay so that the switch contacts AH remain in the open state, as shown. Only the "re-spin feature" is then available and is effective when the feature relay is energised.

In yet other embodiments of the invention the buttons H1 to H3 may be adapted so as to stop the reels when operated during the "re-spin feature", the reels being automatically re-spun at the commencement of the feature. Preferably, each button stops the associated reel only whilst it is held operated so that the reel can be re-spun a plurality of times by repeatedly operating and releasing the button until it displays a special prize-winning symbol, the reel then either being stopped automatically by symbol detection means or being stopped by a respective manual operation.

In yet other embodiments of the invention, instead of the "re-spin feature" being made available for a predetermined period of time, the number of re-spins of all the reels or of each individual reel may be limited to a predetermined maximum number. This can be achieved in the illustrated embodiments by providing counting means in place of the timer to count the number of times the hold switches are operated and to de-energise the feature relay once a predetermined maximum number is reached.

Further, in both those embodiments in which the "re-spin feature" is available for a predetermined period of time and those in which the number of re-spins is limited, said predetermined time period and said predetermined maximum number of re-spins may be varied at random from one game to the next.

Further, it will be appreciated that although the invention has been described above with reference to fruit machines having a reel mechanism to produce a display of symbols and a cam timer to control the operating sequence of the machine, the invention is applicable to gaming machines generally having any form of display means and control means.

WHAT WE CLAIM IS:—

1. A gaming machine comprising display means that operates during each game to display a first combination of symbols, each of which is selected at random from a fixed number of symbols, and manual control means that is operable by a player during a game so as to change said first combination of symbols displayed by said display means during that game, said manual control means enabling each of one or more of said symbols of the first combination to be re-selected from all of said fixed number of symbols.

2. A machine as claimed in Claim 1 in which the display means comprises a plurality of symbol display devices, each of which selects one of the symbols of said first combination of symbols by operating in a cyclic manner to display said fixed number of symbols in succession and stopping at random to select the symbol displayed at the instant of stopping, said device operating again to re-select a symbol and being stopped under the control of said manual control means.

3. A gaming machine as claimed in Claim 2 in which the manual control means comprises a manually operable member for each display device displaying a symbol that is to be re-selectable, each operable member being such as to cause the associated display device to change its displayed symbol continuously whilst the operable member is held operated, and to display the re-selected symbol when the operable member is released.

4. A gaming machine as claimed in Claim 3 in which each display device comprises a reel or disc that carries said symbols around its periphery and which is spun and stopped to display one of the symbols of said combination of symbols in a display window, rotation of the reel or disc being controlled by a latch member which releases the reel or disc for rotation when the associated operable member is operated.

5. A gaming machine as claimed in Claim 4 in which each operable member controls an electric switch connected in a series circuit with an electrical actuator that operates the latch member.

6. A gaming machine as claimed in any one of the preceding claims in which the manual control means is effective to allow said symbols to be changed only during some games.

7. A gaming machine as claimed in Claim 6 in which the manual control means is effective only during randomly selected games.

8 A gaming machine as claimed in Claim 6 in which the manual control means is effective only during games in which said first randomly selected combination of symbols corresponds to a predetermined special combination of symbols.

9. A gaming machine as claimed in any one of the preceding claims in which the manual control means has an alternative function besides that of enabling one or more of the symbols of said first selected combination to be re-selected, the alternative function being effective only during randomly selected games before the display means operates and being such as to enable the player to prevent one or more of the symbols of the displayed combination from changing when the display means subsequently operates to produce said first selected combination of symbols.

10. A gaming machine as claimed in Claim 9 in which the display means comprises a plurality of symbol display devices each of which displays one of said combination of symbols, and in which the manual control means comprises a separate manually operable member associated with each display device so as to control operation of the latter.

11. A gaming machine as claimed in Claim 10 in which each display device has an electrical actuator connected in a respective first control circuit including a first switch controlled by a switching device in a respective second control circuit including a second switch controlled by the manually operable member associated with the display device, the arrangement being such that the machine controls both control circuits so that the first control circuit is effective to operate the display device and thereby select a symbol for said first selected combination, and the second control circuit is effective, on operation of the manually operable member, to prevent the first circuit from operating the display device, operation of said manually operable member causing operation of the associated second switch and thereby operation of said switching device, which thereupon operates the associated first switch in the first control circuit and breaks the first control circuit to the electrical actuator of the display device.

12. A gaming machine as claimed in Claim 11 in which the switching device in the second control circuit controls a further switch in a holding circuit which operates to maintain the switching device operated once it has been operated by operation of the manually operable member.

13. A gaming machine as claimed in Claim 11 or 12 in which a two-way switch is connected between the switching device and the second switch in the second control circuit so that in one state the two-way switch connects the second switch to the switching device for operation of the latter, and in the other state the two-way switch connects the second switch through a suitable electrical connection directly to the electric actuator of the display device for operation of the latter, the two-way switch being controlled by a selector device that determines which of said alternative functions the manual control means is to perform.

14. A gaming machine as claimed in Claim 11 in which the first switch is a two-way switch that assumes a first state when the switching device in the second control circuit is not operated, and assumes a second state when the switching device in the second control circuit is operated, the two-way switch in the second state serving to connect the electric actuator of the display device to a selector switch that determines which of said alternative functions the manual control means is to perform, the electric actuator only being operated when the selector switch selects the symbol changing function rather than the symbol change prevention function.

15. A gaming machine as claimed in Claim 14 in which the switching device in the second control circuit controls a further switch in a holding circuit which includes a second selector switch ganged to the first mentioned selector switch so that the holding circuit maintains the switching device operated once it has been operated by operation of the manually operable member only if the first and second selector switches are selecting the symbol change prevention function rather than the symbol changing function.

16. A gaming machine as claimed in any one of the preceding claims which includes a timer that allows the player a predetermined time period during which he can operate the manual control means to re-select said symbols of the first selected combination as many times as he desires.

17. A gaming machine as claimed in Claim 16 in which said timer commences timing of said predetermined time period on the first operation of said manual control means.

18. A gaming machine as claimed in any one of Claims 1 to 15 which includes a counter that limits the number of times a player can operate the manual control means to a predetermined maximum number of times.

19. A gaming machine as claimed in any one of the preceding claims in which the machine has only one set of prize-winning combinations of symbols.

20. A gaming machine as claimed in any one of Claims 1 to 18 in which the machine has one set of prize-winning combinations of symbols which is effective for the first selected combination of symbols, and a second, different, prize-winning combination of symbols which is effective when the manual control means is operated.

21. A gaming machine substantially as herein described with reference to Figures 1 and 2 or Figure 3 of the accompanying drawings.

BARKER, BRETTELL & DUNCAN,
Chartered Patent Agents,
Agents for the Applicants,
138 Hagley Road, Edgbaston,
Birmingham, B16 9PW.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1978.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

1535095 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

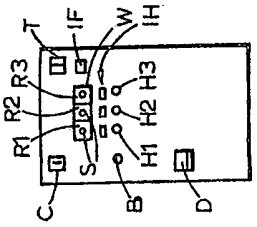

FIG.1.

FIG.2.

1535095 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 2

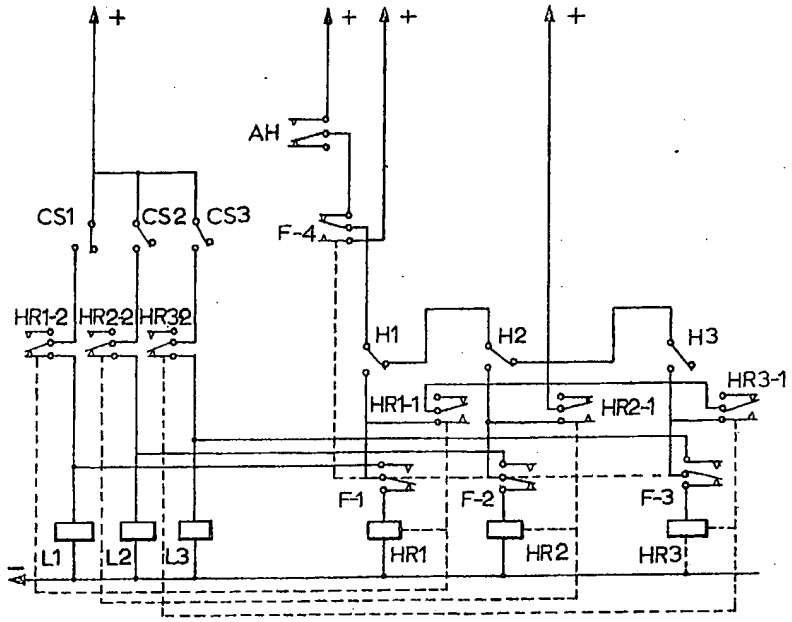

FIG.3.